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# Designing For Child Resilience

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**Abstract**

This short case study describes the design and initial feedback of a color-changing “mood lamp” that allows children to make informed decisions about risk-taking behavior on the internet. Such a device is a case study of an attempt to improve resilience amongst unsupervised children on the internet: an important goal in child protection studies.

**Author Keywords**

Child protection; risk; behavior; internet; ethics;

**ACM Classification Keywords**

H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous;

**Introduction**

Online child protection technologies are traditionally in either the realm of filters and monitors that block content and report children’s behavior back to their parents (such as Net Nanny [6]), or in the area of law enforcement assistive technologies (such as [5]). Recent research into online child protection efforts has raised the possibility that an entirely different set of technologies could address this serious concern. Such technologies could assist in encouraging child “resilience” – a term coined by social science researchers [1, and, for a history of the term, 4] for the ability of most children to remain unaffected by

potential Internet groomers or undesirable Internet content (such as pornographic images, etc.).

This case study describes an effort to design a piece of technology that improves child resilience by providing a real-time risk alert system by way of a color-changing “mood lamp”. It discusses the theory and reasoning behind the design and the novel approach to help to address a sensitive but important problem.

### **Context**

This project arose from within the Isis project, a UK ESRC/EPSRC-funded research project that developed law enforcement technologies to assist in processing of data in online child protection investigations<sup>1</sup>. As part of the research into the ethical and social impact of online child protection technologies, it was considered important by the researchers and project stakeholders (including law enforcement, children’s services, technology ethicists, children, and parents) to explore alternative approaches to provide a well-rounded study of potential assistive technologies.

### **Resilience**

Children are most likely to access the internet from their bedrooms [3] which makes it more difficult for parents to supervise them. Consequently many children are unsupervised or supervision is delegated to a software solution, such as Net Nanny [6]. However, the problems with such traditional monitoring and filtering devices are significant. These problems include causing distrust in family relationships, triggering false positives, blocking innocent content [7], causing a false sense of security about online safety, impinging on the

privacy of the child, and causing the child to become more secretive about their behavior, to name a few. Additionally, many children are not at all vulnerable to long term harm from accessing undesirable content or falling prey to online predators. These children are described as “resilient”. However, there is a smaller group of young people, the “disinhibited”, who are often willing to interact with offenders and engage with them due to reasons such as negative self-esteem, parental problems, difficulties at school, loneliness, self-harm, or familial sexual abuse. They can, in some cases, use sexual names or actively seek sexual encounters with people online. These are ideal targets for pedophiles seeking relationships with children with the possibility for future contact offences [1].

It is important to be mindful of the differences between risk-taking behaviors that result in harm, and those which are harmless. Children naturally partake in risk-taking behavior as part of their experiences in growing up. For the most part, the risky behavior results in little actual harm being done to the child. According to Livingstone, et. al, [3], most children are aware that internet use is risky, and many children perceive that there are risks that are likely to harm other children their age, but don’t often report sustaining harm from their own internet use. Throughout the survey conducted by EU Kids Online (ibid.) and the research conducted by the European Online Grooming Project [1], it was found that the harms from risk are mitigated in some parts by reporting events to a peer or parent, and through successful self-assessment of risk factors.

### **Designing for Resilience**

Initially, the design for the color-changing “mood lamp” [Fig. 1] focused on it being a tool for parents to

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<sup>1</sup> EPSRC/ESRC (EP/F035454/1, EP/F035438/1, EP/F034071/1)

remotely supervise children's access to the internet, in a more ethical, privacy-wise, manner than traditional monitors and filters. The monitoring software underlying the device would alert the parent to unusual or potentially problematic activity (such as visiting certain categories of websites, such as social network sites) on the part of the child, at which point the parent could intervene or check up on the child without knowing what specifically had triggered the alert.

In this supervisory case, the idea would be for the household to have the lamp in a prominent part of the house where a parent could maintain a simple supervision of their child without obtaining too much information other than the sorts of activities the child is engaging in. Familial conversations that arise from this supervisory process could improve resilience of children - indeed, initial research indicates that children with higher resilience rates seem to be more likely to discuss their activities with peers and family [1, 3]. Contextual visibility of behavioral data such as this has been discussed extensively (e.g. in [2]): the awareness of the children of the awareness of the parents of the colors in the lamp could allow for better conversations.

Additionally, and after consultation with children and stakeholders, the device would also provide children with a way for them to monitor their own behavior. The aim is for it to be desirable for children to use, rather than placing it as an obstacle. Desirability could be enhanced by some sort of achievement system if used by the child to self-monitor. The reason for this dual target approach is to include the particularly vulnerable children who may suffer from lack of parental input and supervision - if given these devices by schools or youth services groups, such children could become more

resilient than they otherwise would through the ability to monitor their own risks.



**Figure 1:** "Ghostie", the color-based Internet monitoring device.

## Development

The device chosen for prototyping the technical design was an Ikea children's night light, "Spöka". It was chosen for its cute shape that was designed to appeal to children. The internals of the original lamp were replaced by three RGB LEDs and an Arduino prototyping microprocessor board. The software is comprised of two parts: the software running on the Arduino, and the software running on the PC being monitored. The former is a set of simple drivers that run the Arduino chip, allowing a control program on the computer to change the LED colors to specific RGB values. The latter is a Python program which listens on network sockets and makes decisions based on where the network traffic is coming and going. If, for example, a child is visiting educational, "homework" websites, the lamp changes to green. However, if the

child visits a social networking site the lamp changes to yellow. Use of email or instant messenger (IM) may change the lamp's color again, and so on. There is also the potential to tailor the color to particular sorts of use, for example, IM conversations could be singled out and color coded depending on the topic of conversation.

### Reception

Initial feedback with groups of schoolchildren aged around 14 years has shown to be good, with particular interest in the self-monitoring aspects of the device. These children were quite knowledgeable about the potential issues of online predators and undesired content. They also reported low opinions of traditional monitoring software (especially when it came to false positives), and confessed to having worked around filtering software frequently. The design and aims of the lamp device were particularly intriguing to them, and the autonomy provided by the device was highly desirable, since the children didn't, for the most part, want their parents to know what they were doing on the Internet.

### Conclusion

This paper puts forward a design and development case in a realm that has traditionally forgotten the very people it wants to protect and the role they can take in their own safety. By aiming for resilience, using a novel device that aims for desirability as well as functionality, this study shows that there is significant potential for technologies to assist in online child protection in ways that protect children's privacy and autonomy.

This work presents a new starting point for people engaged in child protection technologies that deviate from the conventional approaches commonly seen in

products. Our hope is that this case example will stimulate other practitioners and researchers to look at new ways of developing resilient, healthy perspectives on the internet.

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